

GOVDOC

MS/B16

AA

72/1

RECEIVED

SEP 19 2003

BOSTON PUBLIC LIBRARY
GOVERNMENT DOCUMENTS DEPARTMENT

ECONOMIC FEASIBILITY OF A SMALL ARENA FOR THE BOSTON AREA REPORT A

ECONOMIC FEASIBILITY OF A SMALL ARENA
FOR THE BOSTON AREA

REPORT A

Prepared For:

The Boston Arena Authority

By

Darley/Gobar Associates, Inc.
6363 Alvarado Court
San Diego, California 92120

January 1972

ACKNOWLEDGEMENT

Darley/Gobar Associates, Inc. wishes to acknowledge the contribution of Finch-Heery, Architects and Engineers of Atlanta, Georgia - a joint venture of Heery & Heery and Finch Alexander Barnes Rothschild and Paschal, for their survey of alternative site locations and preparation of architectural and cost information contained in this report.

TABLE OF CONTENTS

<u>Chapter</u>		<u>Page</u>
I	INTRODUCTION	1
II	SUMMARY AND CONCLUSIONS	3
III	MARKET DEMAND FOR ARENA USAGE	6
IV	FACILITY REQUIREMENTS	17
	Event Schedules	17
	Amateur Sports	18
	Professional Entertainment	18
	Circus/Rodeo	19
	Conventions	19
	Other Events	20
	Scheduling Potential	21
V	OPERATING INCOME AND EXPENSE PROJECTIONS	32
	Income	32
	Expenses	35
VI	ARCHITECTURAL ANALYSIS	41
	Introduction	41
	Program Analysis	42
	Program of Requirements, Small Arena	44
	Program of Requirements, Existing Arena	47



Digitized by the Internet Archive
in 2012 with funding from
Boston Public Library

<http://www.archive.org/details/economicfeasibil00bost>

TABLE OF CONTENTS (Continued)

<u>Chapter</u>		<u>Page</u>
	Site Analysis	50
	South Station	51
	North Station	53
	Kendall Square	55
	Existing Boston Arena Site	57
	Time Schedules	61
	Estimates	63
	Small Arena - South Station	64
	Small Arena - North Station	65
	Small Arena - Kendall Square	66
	Small Arena - Existing Boston Arena Site	67
	Renovate Existing Arena	68
VII	SITE CONSIDERATIONS AND INVESTMENT IMPLICATIONS	69
APPENDIX A	ECONOMIC IMPACT EFFECTS OF CONVENTION ACTIVITY	75

LIST OF EXHIBITS

<u>Exhibit</u>		<u>Page</u>
II-1	Net Unserviced Debt Implied by Facility and Site Options for 6,000-8,000 Seat Arena	5
III-1	Population Characteristics of Major Cities in the U.S.	9
III-2	Family Income in Major Cities in the U.S.	10
III-3	Employment Profile, City of Boston and Boston Metropolitan Area	11
III-4	Sports Receipts Levels for Selected Metropolitan Areas, 1967	12
III-5	Consumer Demand and Expenditures for Sports Events	13
III-6	National Basketball Association 1970-71 Attendance Breakdown	14
III-7	National Hockey League 1970-71 Attendance Breakdown	15
III-8	U.S. Expenditure for Admission to Spectator Sports	16
IV-1	Event Schedule at Boston Garden, September 1971 through May 1972	23
IV-2	Event Schedule at Boston Arena, 1970-71	24
IV-3	John B. Hynes Civic Auditorium 1972 Event Schedule	25
IV-4	Existing Large Indoor Mass Spectator Facilities in the Boston Area	26
IV-5	Representative Schedules at Arenas in Other Cities	27
IV-6	Analysis of Event Day Supply and Demand in the Boston Area for Arena-Type Events	28
IV-7	Size Distribution of a Sample of Large National Conventions	29

LIST OF EXHIBITS (Continued)

<u>Exhibit</u>		<u>Page</u>
IV-8	Size Distribution of Conventions Held in Boston During 1971 by Type of Facility	30
IV-9	Pro-forma Event Schedule of a New or Refurbished Small Arena	31
V-1	Per Capita Income to Arena by Type of Event	37
V-2	Attendance and Revenue Projections by Type of Event for a Small Arena	38
V-3	Non-Reimbursed Annual Operating Expense Projections for a Small Arena	39
V-4	Debt Service Capacity from Arena Operating Surplus	40
VI-1	Type of Arrival Tabulation	43
VI-2	Site Configuration - Small Arena - South Station	52
VI-3	Site Configuration - Small Arena - North Station	54
VI-4	Site Configuration - Small Arena - Kendall Square	56
VI-5	Site Configuration - Small Arena - Existing Arena Site	58
VI-6	Site Configuration - Renovated Existing Arena	59
VII-1	Construction Cost Estimates for Alternative Locations and Facility Options	72
VII-2	Parking Revenue at Various Site Options	73
VII-3	Projected Capital Investment Subsidies Required to Refurbish Boston Arena or Build Comparable New Arena	74

CHAPTER I

INTRODUCTION

For an area of its size and diversity, Boston has limited mass spectator facilities. The Boston Arena and the Boston Garden are both old buildings. Their combined capacity is inadequate to meet all the needs of the area for such facilities. Lack of air conditioning in either facility further inhibits their usefulness by forcing most events into fall, winter, and spring months. Inadequate capacity for mass spectator events is attested to by the heavy event schedules which both buildings support.

In addition to an unambiguous quantitative shortage of such facilities in Boston is the evident qualitative limitations of the facilities related to their age. The Boston Arena, a fine building when new, is old and technologically obsolete. Its poor location and aged condition are incompatible with the needs of a dynamic modern urban area such as Boston. The need for better facilities to serve the Boston area is strongly evident.

The problem of defining the appropriate structural requirements to rebuild the Boston Arena, replace it, or supplement it, however, is a complex one. For this reason, the Boston Arena Authority retained several expert consultants to accumulate and array data pertinent to the problem. R. G. Heim and the consultant firms of Darley/Gobar Associates, Inc. (economists) and Finch-Heery (architects and engineers) were retained to provide data to the members of the Authority to aid them in determining the appropriate policies with regard to possible courses of action. Pro forma event schedules, operating income and expense projections, and construction cost factors were prepared in a format to permit the Authority to evaluate the

economic implications of a range of reasonable alternatives.

Two reports have been prepared. One (Report A) deals with providing facilities for the activities currently being accommodated by the Boston Arena. The other (Report B) deals with the economic and physical design implications of constructing and operating a larger facility to accommodate local mass spectator facility requirements not currently being served or being served somewhat imperfectly by existing facilities.

It should be recognized that there is an infinite set of possible combinations of facility design, location, and cost. Similarly the possible combinations of event schedule, income, and expense are practically limitless. The interaction of the two sets of ranges of conditions creates an even broader range of possible projections. To some extent the most appropriate actual projections relate to policy decisions regarding the proposed scope of operations which meet the greatest proportion of local economic and social needs as defined by the Authority.

After the Authority reviews the various alternative operating options discussed in the reports it can select the one or some compromise which is most compatible with its objectives. On the basis of the definition of the segment of the market which the Authority feels it should serve best, a new program of events and the necessary facilities can be devised. Such a specific program would necessarily be more economically efficient, because the facilities can be designed specifically to meet the program's needs. It will no longer be incumbent on the consultants to hedge on the facility design in terms of broader possible use requirements.

CHAPTER II

SUMMARY AND CONCLUSIONS

1. The present Boston Arena's obsolete condition is such that it cannot long continue to function. To refurbish it completely will cost about \$6.12 million.

The refurbishing period of 60 weeks would deprive the community of the services of the facility for over one year. On completion of renovation, the facility would more than adequately serve the functions which it is presently serving, and would be attractive enough to have somewhat expanded usage.

2. A new arena, comparable in size to the present Boston Arena could be constructed at the present site or at any of three other sites considered. The cost of construction excluding land costs at the sites considered are as follows:

Present site	\$10.479 - \$12.189 million
Kendall Square	\$10.032 - \$11.742 million
North Station	\$ 9.519 - \$11.229 million
South Station	\$ 9.291 - \$11.001 million

The range of cost estimates for each site is based on the option of including a permanent practice track in each. There is a possibility that including such a track would result in a \$3.5 million construction grant, thus reducing the net investment that would have to be made by the Authority.

Construction of a new arena would require 75 weeks. If a new arena is constructed at the present site, parts of at least two seasons of

service would be lost to the community. Such action would, however, minimize direct land costs. Land costs at a new site could, however, be partially recovered from the proceeds of sale of the present site after the new facility is complete.

3. Neither renovation of the present arena nor construction of a new arena could be expected to be financed out of operating revenues. Revenues in a new or refurbished small arena are expected to be about \$277,000 - \$290,000 per year. Operating expenses of about \$165,000 per year would leave \$110,000 - \$125,000 per year for debt service. Annual debt service contributions of this magnitude would service \$1.9 - \$2.1 million in debt. Additional net parking income at each site is projected as follows:

	Parking Revenue	Implicit Debt Serviced
Present site:		
Renovation	\$30,868	\$0.53 million
New Arena	\$40,122	\$0.70 million
Kendall Square	\$60,450	\$1.04 million
North Station	None	---
South Station	None	---

These incomes could be applied to the debt service, but in no case would the income fully service the debt required to rebuild the existing arena or build a new unit to replace it.

4. The net debt service subsidy required for each of the small arena options considered is summarized in Exhibit II-1.

EXHIBIT II-1

NET UNSERVICED DEBT IMPLIED BY FACILITY AND SITE OPTIONS FOR 6,000-8,000 SEAT ARENA
(In Millions of Dollars)

	Present Site		Kendall Square	North Station	South Station
	Renovate	Build			
	Present Arena	New Arena	New Arena	New Arena	New Arena
Investment (Excludes land and practice track)	\$ 6.120	\$10.479	\$10.032	\$ 9.519	\$ 9.291
Debt serviced from operations and parking income	2.430	2.790	3.140	2.100	2.100
Net Unserviced Debt	\$ 3.690	\$ 7.689	\$ 6.892	\$ 7.419	\$ 7.191
Net debt reduction from \$3.5 mil. capital contribution for schoolboy track (less capital cost of providing the track)	0	1.790	1.790	1.790	1.790
Net Unserviced Debt	\$ 3.690	\$ 5.899	\$ 5.102	\$ 5.629	\$ 5.401

Source: Darley/Gobar Associates, Inc.

CHAPTER III

MARKET DEMAND FOR ARENA USAGE

Boston is one of the largest U.S. markets for mass spectator events. It ranks sixth in the U.S. in total population in the metropolitan area (Exhibit III-1). Because of the heavy support which mass spectator events draw from the more affluent elements in the population, the area's population of more than 650,000 households with annual incomes over \$8,000 is particularly significant in determining the area's potential to utilize public spectator facilities (Exhibit III-2).

The City of Boston is essentially the administrative core of the Boston Standard Metropolitan Statistical Area. Like many core areas, Boston's population has been declining. The decline, however, is expected to subside and population stabilization and perhaps slight growth can be projected for the core area. Unlike many urban core areas, the City of Boston's employment base is growing both in number of jobs and in output. Boston has about 25 percent of the metropolitan area's population and produces nearly 50 percent of the total metropolitan area's output.

Employment patterns in the metropolitan area are more heavily oriented to financial firms and service activities than in the U.S. as a whole (Exhibit III-3). On the other hand, the Boston economy is less dependent on manufacturing jobs than are the economies of the greater Boston metropolitan area and the U.S. The net effect of these relationships is that Boston is a financial and administrative center with a large employment base. The pattern of income and occupations that are derivative of this is one especially compatible with strong support of mass spectator events.

More significant than abstract analyses of the area's economic statistics, however, is the actual history of fan support of sports in Boston.

In spite of relatively obsolete facilities, the Boston Standard Metropolitan Statistical Area in 1967 (the most recent year for which data are available) enjoyed the seventh highest level of sports receipts of any metropolitan area in the U.S. It had a per capita level of sports expenditure higher than most areas except for those such as Miami and New York which benefit from large tourist expenditure (Exhibit III-4). The market's socio-economic profile with large numbers of higher income families and with large percentages of managerial and professional/technical occupations represented in the population is consistent with a strong sports and entertainment market (Exhibit III-5).

Although the NBA Boston Celtics rank about eighth in total attendance (Exhibit III-6), part of the relatively poor attendance can be accounted for by the extremely tight schedule at the Boston Garden where NHL, AHL, and NBA teams compete for prime dates. Hockey attendance for the Boston Bruins in the NHL is nearly 99 percent of the Boston Garden's capacity (Exhibit III-7), indicative of strong support and preferential dates. It should be pointed out that market support for hockey in Boston is extraordinary for both the NHL and the AHL teams playing in the Boston Garden. In fact, 43.6 percent of the Garden's schedule in 71/72 was some form of professional hockey.

The future is bright for professional sports, shows, amateur sports and other arena events in Boston. Population of the metropolitan area is expected to continue to rise. Employment increases are forecast, not only for the metropolitan area but also for the core represented by the City of Boston.

The labor force in Boston is more productive than is the labor force in the U.S. as a whole. Workers throughout the metropolitan area are more efficient and, hence, more productive, and as a result more affluent than the average worker in the U.S. The result is that the market potential for arena events in Boston will continue to grow, putting more pressure on the already inadequate existing facilities.

In addition to the established and demonstrated market for arena-type activities in Boston, it can be anticipated that demand for such activities will continue to grow. Expenditures for admissions to spectator sports - only one element in the spectrum of arena events - continue to rise nationally (Exhibit III-8).

Demand for arena facilities in Boston is further evidenced by the heavy schedules. Most large arenas consider a 200-225 day schedule to be the maximum capacity of the building. The Boston Garden, which because of lack of air conditioning is largely dark for three months a year, crowds a 216 day schedule into nine months. The old, obsolete, poorly located Boston Arena, operating with inadequate parking and substandard facilities, operates a 156 day event schedule in addition to a heavy schedule of practice sessions for amateur hockey.

EXHIBIT III-1

POPULATION CHARACTERISTICS OF MAJOR CITIES IN THE U. S.

Metropolitan Area	Total Population (000)	Urban Population (000)	Percent of Urban Population
New York	11,589.9	11,406.3	98.4
Los Angeles	7,128.2	7,033.4	98.7
Chicago	7,023.6	6,725.8	95.8
Philadelphia	4,815.4	4,293.5	89.2
Detroit	4,241.5	4,050.8	95.5
BOSTON	<u>3,344.3</u>	<u>3,083.3</u>	<u>92.2</u>
San Francisco-Oakland	3,151.9	3,077.1	97.6
Washington, D.C.	2,892.4	2,671.8	92.4
Pittsburgh	2,394.3	1,989.8	83.1
St. Louis	2,367.1	2,033.4	85.9
Baltimore	2,088.4	1,759.7	84.3
Cleveland	2,072.9	1,948.9	94.0
Houston	2,037.9	1,833.3	90.0
Minneapolis-St. Paul	1,825.3	1,739.6	95.3
Dallas	1,597.3	1,482.1	92.8
Seattle	1,436.4	1,271.0	88.5
Atlanta	1,413.4	1,206.5	85.4
Milwaukee	1,397.7	1,300.1	93.0
Cincinnati	1,388.9	1,170.4	84.3
San Diego	1,370.1	1,278.9	93.3
Buffalo	1,349.9	1,146.4	84.9
Miami	1,301.4	1,279.6	98.3
Kansas City	1,282.2	1,167.7	91.1
Denver	1,252.1	1,177.0	94.0
Indianapolis	1,119.1	921.7	82.4

Source: Sales Management, 1971 Survey of Buying Power, July 10, 1971.

EXHIBIT III-2

FAMILY INCOME IN MAJOR CITIES IN THE U. S.

Metropolitan Area	Effective Buying Income 1970		% of Households with Income Over \$8,000	Estimated Number of Households (000's)	Number of House- holds with Income Over \$8,000 (000's)
	Per Capita	Per Household			
New York	\$ 4,221	\$17,616	50.0	3,877.3	2,322.5
Los Angeles	4,088	11,782	56.9	2,473.4	1,407.4
Chicago	4,151	13,227	66.3	2,204.5	1,461.6
Philadelphia	3,598	11,677	57.5	1,483.9	853.2
Detroit	3,785	12,498	64.5	1,284.5	828.5
BOSTON	3,929	12,649	62.7	1,038.9	651.4
San Francisco-Oakland	4,111	11,746	58.0	1,103.1	639.8
Washington, D.C.	4,284	13,593	63.7	911.5	580.6
Pittsburgh	3,421	10,789	53.3	759.2	404.7
St. Louis	3,452	11,100	55.7	736.2	410.1
Baltimore	3,335	11,044	45.3	630.7	285.7
Cleveland	3,938	12,472	64.1	654.5	419.5
Houston	3,380	10,936	53.3	629.9	335.7
Minneapolis-St. Paul	3,837	12,457	65.7	562.2	369.4
Dallas	3,625	11,414	54.6	507.3	277.0
Seattle	3,816	11,429	58.1	479.6	278.6
Atlanta	3,645	11,793	57.4	436.9	250.8
Milwaukee	3,724	12,055	63.5	431.8	274.2
Cincinnati	3,453	11,063	55.0	433.5	238.4
San Diego	3,467	10,785	50.8	440.5	223.8
Buffalo	3,517	11,306	59.3	419.9	249.0
Miami	3,408	10,040	45.9	441.7	202.7
Kansas City	3,726	10,984	56.0	434.9	243.5
Denver	3,469	10,876	53.0	399.4	211.7
Indianapolis	3,548	11,293	56.8	351.6	199.7

Source: Sales Management 1971 Survey of Buying Power, July 10, 1971.

EXHIBIT III-3

EMPLOYMENT PROFILE
CITY OF BOSTON AND BOSTON METROPOLITAN AREA

	City of Boston	Metropolitan Area	U.S.
Agriculture & Mining	0.1	0.3	5.5
Construction	3.5	4.2	4.5
Manufacturing	12.5	22.6	26.2
Trasnportation, Communication & Utilities	8.4	6.2	6.1
Wholesale Trade	8.0)	6.6)	20.2
	) 23.3	) 23.7	
Retail Trade	15.3)	17.1)	
Finance, Insurance, & Real Estate	14.3	7.6	4.9
Services	22.6	24.3	15.6
Government	<u>15.3</u>	<u>11.1</u>	<u>17.0</u>
TOTAL:	100.0	100.0	100.0

Source: Statistical Abstract of the U.S. The Expanding City of Boston Economy (Boston Redevelopment Authority Research Department Community Renewal Program).

EXHIBIT III-4

SPORTS RECEIPTS LEVELS FOR SELECTED METROPOLITAN AREAS, 1967

Metropolitan Area	Total Population 12/31/67 (000)	Commercial Sports*		
		Total Number of Establishments	Total Receipts (000)	Receipts Per Capita
New York	11,625.6	130	\$ 130,347	\$ 11.21
Los Angeles	7,027.0	77	56,931	8.10
Philadelphia	4,785.3	51	29,953	6.26
Detroit	4,113.8	57	33,349	8.11
BOSTON	3,237.2	27	28,308	8.74
San Francisco-Oakland	3,079.2	41	31,619	10.27
Washington, D.C.	2,688.5	39	14,974	5.57
Pittsburgh	2,380.0	18	9,782	4.11
St. Louis	2,331.3	29	16,042	6.88
Cleveland	2,078.6	20	13,928	6.70
Baltimore	2,005.5	32	22,102	11.02
Houston	1,808.5	17	8,576	4.74
Dallas	1,430.5	20	4,234	2.96
Milwaukee	1,377.8	8	901	0.65
Atlanta	1,278.6	6	7,592	5.94
San Diego	1,253.8	15	10,138	8.09
Buffalo	1,330.7	20	5,845	4.39
Miami	1,139.9	70	31,786	27.88
Denver	1,131.3	13	7,092	6.27
New Orleans	1,075.4	30	9,277	8.63
Indianapolis	1,049.0	13	6,876	6.55
Portland	931.8	15	4,392	4.71
Phoenix	895.6	20	5,916	8.61
Providence	827.3	17	12,176	14.72
Greensboro	591.5	8	789	1.33
Charlotte	386.9	6	2,265	5.85
			Average	8.17

* Includes baseball, football, basketball, hockey, sports promoters, horse racing, dog racing, auto and motorcycle racing, and racing stables.

Source: 1967 Census of Business, Selected Services, Area Statistics, Bureau of the Census, Washington D.C., Issued 1970. Population from Sales Management Survey of Buying Power, June 10, 1968.

EXHIBIT III-5

CONSUMER DEMAND AND EXPENDITURES FOR SPORTS EVENTS

All Non-farm Families and Single Consumers			
Consumer Characteristics	Estimated 1966 Distribution of All Families %	Estimated 1966 Distribution of Demand For Sports Events	1960-61 Average Annual Expenditures for Sports Events (\$)
Family Income (Before Taxes)	Under \$3,000	16.0	\$.65
	\$ 3,000 - 5,000	15.0	2.75
	5,000 - 7,500	21.0	5.12
	7,500 - 10,000	19.0	7.39
	10,000 - 15,000	56.0	10.56
	15,000 and Over		18.81
Earner Composition of Family	Husband Working Only	29.5	5.26
	Husband & Wife Only	23.0	6.07
	Husband & Other Combination	11.5	11.08
	All Other	36.0	2.24
Occupation of Head	Professional Tech.	12.0	7.56
	Managers, Officials	12.0	9.46
	Clerical & Sales	11.5	6.35
	Foreman, Craftsmen	16.0	5.80
	Operatives	16.5	4.66
	All Other	32.0	2.02
Geographical Region	Northeast	26.5	4.50
	North Central	27.0	5.47
	South	29.0	4.53
	West	17.5	6.38
Color	White	88.5	5.31
	Non-white	11.5	3.24
Market Location	Central Cities	33.0	5.49
	Urban Fringe	29.0	6.31
	Other Areas	6.5	5.23

Source: Market Profiles of Consumer Products, 1967 and
Expenditure Patterns of The American Family, 1965, Fabian Linden,
 Editor, National Industrial Conference Board, Sponsored by Life.

EXHIBIT III-6

NATIONAL BASKETBALL ASSOCIATION 1970-71 ATTENDANCE BREAKDOWN

Team	Site	# of Games	Total Attendance	Average Per Game	Arena Capacity	% Capacity
New York	New York	42	773,933	18,426	19,500	94.50%
Los Angeles	Los Angeles	40	551,000	13,775	17,643	78.08
Milwaukee	Milwaukee	36	378,106	10,503	10,746	97.74
	Madison	5	40,781	8,156	10,190	80.04
Chicago	Chicago	41	406,763	9,921	17,374	57.10
Seattle	Seattle	35	333,036	9,515	12,382	76.85
	Univ. of Washington	6	42,745	7,124	11,600	61.41
Philadelphia	Philadelphia	38	326,421	8,590	15,244	56.35
Boston	Boston	38	311,182	8,189	15,128	54.13
Phoenix	Phoenix	41	332,145	8,101	12,096	66.97
Detroit	Detroit	40	277,729	6,943	11,009	63.12
San Diego	San Diego	39	264,124	6,772	14,000	48.37
Baltimore	Baltimore	37	221,307	5,981	12,384	48.30
	College Park, Md.	4	28,823	7,206	17,000	42.39
Portland	Portland	39	236,088	6,053	13,000	46.57
Atlanta	Atlanta	41	245,555	5,986	6,996	85.61
San Francisco	San Francisco	25	117,056	4,682	14,500	32.29
	Oakland	13	90,504	6,962	14,000	49.73
Buffalo	Buffalo	36	181,196	5,033	10,683	47.11
	Syracuse	2	3,620	1,810	N.A.	---
	Rochester	2	2,712	1,356	N.A.	---
Cincinnati	Cincinnati	33	133,859	4,056	12,155	33.37
	Omaha, Neb.	6	25,060	4,177	N.A.	---
	Toronto	1	11,599	11,599	N.A.	---
Cleveland	Cleveland	40	141,130	3,528	11,000	32.07
	Total*	680	5,476,474	8,054		

* Does not include one game between San Francisco and New York played at St. Louis (Att.-12,482) and one game between Chicago and Cincinnati played at Los Cruces, N. Mex. (Att.-9,097). There were also nine games played as doubleheaders but attendance was attributed to home team only. Totals do not agree with those officially announced by NBA - 5,330,393 attendance at 697 regular season games.

Source: Box scores from Sporting News and the Official National Basketball Association Guide.

EXHIBIT III-7

NATIONAL HOCKEY LEAGUE
1970-71 ATTENDANCE BREAKDOWN

Team	Number of Games	Total Attendance	Average Per Game	Arena Capacity	% Capacity
Chicago	38	723,950	19,051	20,000	95.26
St. Louis	36	656,501	18,236	18,250	99.92
New York	36	620,682	17,241	18,000	95.78
Montreal	37	629,077	17,002	17,500	97.15
Toronto	36	585,824	16,273	17,179	94.73
Vancouver	38	578,909	15,234	15,573	97.82
Boston	38	568,752	14,967	15,300	97.82
Minnesota	38	550,867	14,497	15,000	96.65
Philadelphia	36	507,250	14,090	15,000	93.93
Detroit	38	497,424	13,090	14,500	90.28
Pittsburgh	37	369,663	9,991	12,000	83.26
Buffalo	38	367,929	9,682	10,000	96.82
Los Angeles	37	350,003	9,460	16,000	59.13
Oakland	37	217,135	5,869	12,500	46.95
Total*	520	7,223,966	13,892	---	---

* Regular season games only.

Source: Box scores from Sporting News and AudArena Stadium, 1972 Edition, Fall 1971.

EXHIBIT III-8

U. S. EXPENDITURE FOR ADMISSION TO SPECTATOR SPORTS

Year	Expenditure	Change in Expenditure
1964	\$365,000,000	
1965	389,000,000	\$24,000,000
1966	414,000,000	25,000,000
1967	436,000,000	22,000,000
1968	453,000,000	17,000,000
1969	487,000,000	34,000,000
1970	516,000,000	29,000,000

Source: Survey of Current Business, July Issue,
Various Years.

CHAPTER IV

FACILITY REQUIREMENTS

The event schedule in a small (6,000 seat) arena is limited by the maximum seating capacity. Professional basketball and hockey and entertainment events such as ice shows, large circuses and major entertainment events generally require seating capacities of 10-15,000 or more, especially in a major metropolitan area such as Boston.

Event Schedules

Currently, the Boston Garden schedules 216 event days per year in a nine month season. This is an extremely heavy schedule (Exhibit IV-1). Because it is being operated by a private entity, the Boston Garden must concentrate on the most profitable events. Indeed, nearly 85 percent of the schedule is composed of professional sports and entertainment events, displacing less profitable civic, cultural, and public interest functions to other facilities or precluding their occurrence in Boston.

In spite of its location, poor physical condition, size and other limitations, the old Boston Arena also has a heavy schedule with public service events predominating. The Boston Arena schedule is made up largely of amateur hockey with a large amount of practice usage which does not appear on the schedule (Exhibit IV-2). The other major indoor facility in Boston is the John B. Hynes Auditorium. It, too, has a heavy schedule of 171 event days considering the special orientation of the facility and limitations on its use imposed by its largely single purpose design (Exhibit IV-3).

The heavy schedule at local facilities is related to the Boston Metropolitan Area's size, its special mania for hockey, and to the relatively inadequate capacity of existing facilities (Exhibit IV-4). For comparison purposes, many communities that are smaller than Boston have more scheduled events in entertainment, sports, conventions, and civic activities (Exhibit IV-5). Boston has an especially strong demand for arena facilities because of the AHL team which by itself could constitute 20 percent of a typical arena's schedule and also because of the need for hockey practice arenas. As a result, many events - track meets, boxing shows, religious meetings, and conventions - are pre-empted from using the only existing large arena in Boston. The basic elements in a smaller arena's schedule are amateur sports, circuses/rodeos, stage shows and concerts, conventions, local meetings, and civic events which require a moderately large seating capacity. If unlimited facilities were available, Boston could easily support a schedule of 700-775 event days per year (Exhibit IV-6, Column A).

Amateur Sports. In some areas, college basketball is a major arena use. High school basketball tournaments are another potential use as are indoor track meets. In Boston there is the added dimension of substantial programs of amateur hockey. For an arena with dates available, an amateur basketball schedule of 15 days for college and six days for high school tournaments would be perfectly feasible. In addition, a schedule of three to six days of track meets and, in Boston, 125 days of high school and college hockey would create a total potential schedule of approximately 150 event days of amateur sports.

Professional Entertainment. Concerts of rock groups, featured stars, etc. are a major user of large arenas in large urban market areas. The high

concentration of colleges and universities in the Boston area gives this market even greater potential for entertainment events. In 1970, the Los Angeles Forum had 26 such concerts which drew an average of almost 14,000 spectators per event. In the same City, the Los Angeles Sports Arena hosted ten additional event days of comparable types of shows, and the Pauley Pavilion had six major concerts. Typical attractions are groups like the Led Zeppelin and individuals like Elvis Presley and Tom Jones. The Boston market is large enough to support at least 20-30 days a year of concert activity of a type with a large enough draw to require arena-scale seating capacity. The heavy sports schedule at the Boston Garden precludes some of these events from being presented in the Boston area, but a new smaller arena could service a limited entertainment event schedule.

Circus/Rodeo. Circuses are a major tenant of arenas. The Boston Garden schedules 14 circus days per year. Other large markets schedule circuses up to 30 days per year. A reasonable potential schedule in Boston is 25 days per year. Were a facility available, it is expected that the market area would also support rodeos five to ten days per year. A conservative schedule of circuses and rodeos in Boston would be 30-35 potential event days per year.

Conventions. These types of events produce little revenue but do provide a civic service and a conduit through which to attract convention spending to the local economy. The John B. Hynes Auditorium schedules about 76 days per year of convention events. Use of an arena for conventions is fairly limited. Hotels can accommodate most conventions of 2,500 or less - depending on the amount of exhibit space required. Only about 25 percent of all large national conventions have attendance of over 2,500. Indeed,

only 19 percent of all large national conventions have attendance of over 5,000 with 8 percent falling in the 5,000 to 7,500 range (Exhibit IV-7). Because of their low rental income potential, conventions are probably not actively sought by the Boston Garden - the only Boston facility with sufficient capacity to accommodate the larger conventions. The largest practical and available convention facility in Boston has a maximum capacity of about 5,000 (Exhibit IV-4), precluding the area from competing for large national conventions. As a result, only about 3 percent of the 151 scheduled conventions in Boston have attendance levels over 5,000 (Exhibit IV-8). To that extent, if an arena that could accommodate larger conventions were available in Boston, the City could compete for larger national conventions. There is potential for an additional six or seven major conventions per year in Boston, representing a potential arena schedule of 18-28 event days per year. A smaller arena would not have a significant size advantage in competing with the Hynes Auditorium for such events, and should not expect this use to generate many event days.

Generally, because of the facility limitations, poor revenue potential and schedule conflicts, an arena should seek conventions only as a filler between more lucrative events.

Other Events. Rallies, religious meetings, graduations, banquets, dog shows, and horse shows are frequently held in arenas to take advantage of the large seating and exhibit capacity. Generally, these activities produce only modest revenues and are used to fill voids in the schedules. For example, the Boston Garden probably schedules fewer than ten days per year of such activities, while in arenas in areas with less competition for available dates, these types of events can easily run to 50-60 days per

year. Religious meetings usually draw large audiences but produce low rents. Graduations and rallies often are sponsored by public or semi-public agencies and as a result also produce low levels of income. An area like Boston easily has demand for from 60-100 event days per year of this type of miscellaneous semi-public service scheduling with attendance levels compatible with arena-seating capacity.

Scheduling Potential

In total, it is possible to identify demand for at least 700-775 days of potential arena usage in Boston. The actual schedule for a new Boston arena depends on how the demand is allocated between the available facilities. It is assumed, for instance, that practically all conventions and exhibits will continue to use the John B. Hynes Auditorium because it is physically more suitable for such events.

Another factor to consider is the competitive effect of the Boston Garden. Operated by the same group that controls the two professional hockey franchises in Boston, the Garden would probably continue heavy hockey and basketball schedules, thus precluding this facility from servicing the demand for amateur sports events, the less heavily attended entertainment events and the many public service events which require arena-type facilities.

A new 6-8,000 seat facility, resulting from the renovation or replacement of the existing Boston Arena, could expect to retain much the same schedule of amateur sports events as the Boston Arena now services. In addition, a modern air-conditioned facility would provide for an expanded schedule of professional sports (e.g. boxing, wrestling, closed circuit TV) and could capture other events such as smaller entertainment shows, rodeos and

pageants. The addition of a schedule of community meetings, concerts, cultural and religious events produces a potential event schedule as shown in Exhibit IV-9. As demonstrated in the exhibit there would still remain a potential residual demand of as many as 163 arena event days which would not be met by the combined facilities of the Boston Garden and new smaller arena facilities.

Providing a newer facility to replace the Boston Arena would reduce the heavy schedule of hockey practice which the existing facility now services due to the pressure of scheduling other types of more lucrative events. Demand for these practice sessions would have to be absorbed by the numerous private and public practice arenas which are in existence or planned for the Boston area.

EXHIBIT IV-1

EVENT SCHEDULE AT BOSTON GARDEN
SEPTEMBER 1971 THROUGH MAY 1972

Type of Event	Number of Event Days	Percent of Total
<u>Sports Events</u>		
Professional:		
Basketball - NBA	41	19.0%
Hockey - NHL	42	19.5
AHL	38	17.6
Wrestling	6	2.8
Roller Derby	2	0.9
Amateur:		
Basketball - College	2	0.9
Schoolboy	7	3.2
Hockey - College	9	4.2
Schoolboy	5	2.3
Track	2	0.9
<u>Entertainment Events</u>		
Variety Shows	10	4.6
Pageants, Spectaculars, etc.	13	6.0
Ice Shows	24	11.1
Circus, Rodeo, Horse Shows	14	6.5
<u>Other Events</u>		
Olympic Fund Raising	1	0.5
Total	216	100.0%

Source: Boston Gardens Schedule of Events, Season of 1971-72.
Tabulated and calculated by Darley/Gobar Associates, Inc.

EXHIBIT IV-2

EVENT SCHEDULE AT BOSTON ARENA, 1970-71

Type of Event	Number of Event Days	Percent of Total
<u>Sports Events</u>		
Professional	4	2.6
Amateur:		
College Hockey	34	21.8
Schoolboy Hockey	89	57.0
Other Amateur Sports	2	1.3
Closed Circuit TV	4	2.6
<u>Entertainment Events</u>		
Professional Entertainment	2	1.3
Circus	10	6.4
Ice Show	3	1.9
Pageants, etc.	1	0.6
<u>Other Events</u>		
Meetings, Revival, etc.	<u>7</u>	<u>4.5</u>
Total	156	100.0

Source: Boston Arena Management

EXHIBIT IV-3

JOHN B. HYNES CIVIC AUDITORIUM 1972 EVENT SCHEDULE

Event	Number of Event Days
Exhibitions, Shows (Open to the Public)	50
Exhibitions, Trade Shows (Private)	36
Conventions, Meetings, Banquets	76
Other Miscellaneous Events	9
Total	171

Source: John B. Hynes Civic Auditorium management.

EXHIBIT IV-4

EXISTING LARGE* INDOOR MASS SPECTATOR FACILITIES IN THE BOSTON AREA

	Seating Capacity		Exhibit Area		Meeting Rooms #	Rooms Size	Parking # Cars
	Total	Permanent	Main	Other			
Boston Garden	15,300	12,757	26,000	39,000	--	--	2,000
Boston Arena	6,898	5,458	--	--	--	--	--
John B. Hynes Civic Auditorium	5,826	1,826	150,000		10	25-800	--
Boston College Gym	4,200	3,000	--	--	--	--	--
Suffolk Downs	20,000	10,000	90,000	50,000	3	500-2,000	10,000
Ridge Arena-Braintree	5,000	3,000		17,000	--	--	1,250
North Shores Sports Center-Lynn	2,500	2,500	--	--	1	50	--

* Over 2,000 seating capacity.

Source: AudArena Stadium, 1972 Edition, Fall 1971.

EXHIBIT IV-5

REPRESENTATIVE SCHEDULES AT ARENAS IN OTHER CITIES

Event	Seattle Arena & Coliseum	Los Angeles Forum	Denver Arena & Coliseum	Phoenix Arizona Coliseum	San Diego Sports Arena	Dallas Arena	Cincinnati Gardens	Houston Coliseum
Professional Basketball & Hockey	80	90	78	80	79	--	40	--
Amateur Sports	36	7	23	4	3	9	5	4
Other Sporting Events	10	17	24	13	25	10	11	16
Name Entertainment Shows	26	26	18	13	16	18	11	2
Circus, Rodeos, Etc.	17	45	11	22	11	12	10	7
Ice Shows	11	43	11	12	18	13	16	18
Conventions	28	1	5	--	2	21	--	--
Exhibits, Trade Shows	49	--	16	9	6	11	16	--
Pageants, Rallies, Etc.	10	--	3	7	6	6	15	12
Other Misc. Events	59	--	35	7	1	30	4	--
Total	326	229	224	167	167	130	128	59

Source: Interviews and correspondence with management of various arenas.

EXHIBIT IV-6

ANALYSIS OF EVENT DAY SUPPLY AND DEMAND IN THE BOSTON AREA

FOR ARENA-TYPE EVENTS

Event	Total Demand in Area	1971 Event Day Schedules:				Total in Existing Facilities	Unmet Residual Demand
		Boston Garden	Boston Arena	Hynes Auditorium	-E-		
Professional Sports	-A- 200	-B- 129	-C- 8	-D- -	-E- 137	-F- 63	
Amateur Sports	150	25	125	-	150	-	
Professional Entertainment	20-30	10	2	-	12	8-18	
Circus/Rodeo	30-35	14	10	-	24	6-11	
Ice Shows	30-40	24	3	-	27	3-13	
Disney, Pageants, etc.	20	13	1	-	14	6	
Exhibits, Trade Shows	96	-	-	86	86	10	
Conventions	94-104	-	-	76	76	18-28	
Other Events	<u>60-100</u>	<u>1</u>	<u>7</u>	<u>9</u>	<u>17</u>	<u>48-83</u>	
Total	700-775	216	156	171	543	157-232	

Source: Darley/Gobar Associates, Inc.

EXHIBIT IV-7

SIZE DISTRIBUTION OF A SAMPLE OF LARGE NATIONAL CONVENTIONS

Attendance Range	Number	Percent	Cumulative Percent
0 - 49	-	-	-
50 - 99	-	-	-
100 - 149	-	-	-
150 - 199	1	-	-
200 - 299	6	2	2
300 - 399	12	4	6
400 - 499	8	3	9
500 - 999	66	21	30
1,000 - 2,499	109	36	66
2,500 - 4,999	45	15	81
5,000 - 7,499	25	8	89
7,500 - 9,999	15	5	94
10,000 +	19	6	100
	<u>306</u>	<u>100</u>	

Source: Real Estate Research Corporation Market Study & Economic Analysis Proposed Convention Exhibition Center Indianapolis, Indiana, August 1966.

EXHIBIT IV-8

SIZE DISTRIBUTION OF CONVENTIONS HELD IN BOSTON
DURING 1971 BY TYPE OF FACILITY

Attendance Range	Conventions		Total
	At Hotel/Motel Facilities	At Other Facilities	
0 - 100	0.0%	0.0%	0.0%
100 - 149	6.9	0.0	6.7
150 - 199	5.5	0.0	5.3
200 - 299	13.1	0.0	12.7
300 - 399	16.6	0.0	16.0
400 - 499	9.0	0.0	8.7
500 - 599	33.1	40.0	33.3
1,000 - 2,499	13.8	0.0	13.3
2,500 - 4,999	1.4	0.0	1.3
5,000 - 7,499	0.6	40.0	2.0
7,500 - 9,999	0.0	20.0	0.7
10,000 +	0.0	0.0	0.0
Total	100.0%	100.0%	100.0%
Total # of Events in Distribution	145	5	150
Events with No Size Estimated	1	0	1
Total Events Scheduled	146	5	151
Percent by Type	96.7	3.3	100.0

Source: Tabulated and calculated by Darley/Gobar Associates, Inc. based on Greater Boston Chamber of Commerce 1971 Convention Schedule.

EXHIBIT IV-9

PRO-FORMA EVENT SCHEDULE OF A NEW OR REFURBISHED

SMALL ARENA

Event	Total Available Demand	New Small Arena	Boston Garden	Residual Available
Professional Sports	200	30	130	40
Amateur Sports	150	120	25	5
Professional Entertainment	20-30	5	10	5-15
Circus/Rodeo	30-35	10	15	5-10
Ice Shows	30-40	-	20	10-20
Disney, Pageants, etc.	20	5	15	-
Exhibits, Trade Shows	10	-	-	10
Conventions	18-28	10	-	8-18
Other Events	<u>50-90</u>	<u>45</u>	<u>-</u>	<u>5-45</u>
Total	528-603	225	215	88-163

Source: Darley/Gobar Associates, Inc.

CHAPTER V

OPERATING INCOME AND EXPENSE PROJECTIONS

Income

Income to an arena is composed primarily of rentals, concession profits, parking fees, and some long term rentals associated with stadium clubs, etc. Some arenas are operated by management which actively co-promotes events, generating an additional source of revenue. The magnitude of income relates to the schedule of events, attendance, rental rates, concession contracts, and the level of parking fees, etc. There is a wide variation in each of these determinants but the basic expected income for a facility of this type can be determined with reasonable accuracy.

One approach is to project total attendance for each event, average ticket prices for each type event, the terms of rental agreements, and per capita concession and parking expenditure. Another way is to integrate all of these factors to define the arena income per capita attendance for various types of events. The use of single per capita income coefficients for each type of event is useful for studies of this type where several alternative schedules and attendance levels are possible.

For this reason, the income coefficients per capita for each type of event pertinent to a small arena have been defined and summarized in Exhibit V-1. Applying these coefficients to the projected attendance for the event schedule discussed in Chapter IV yields an operating income estimate.

Rental income per capita varies for each type of event. To define the probable arena revenue per capita at a new Boston Arena, other facilities throughout the country were analyzed in detail in terms of attendance and

rental income for analogous types of events. Similar analyses of arena income per capita from concession operations were used to define the appropriate relationships that can be expected to prevail in Boston. It was assumed that food and beverage concessions would be operated by an outside concessionaire on the basis of a 33 percent split to the arena. The per capita concession income figures are based on the assumption that alcoholic beverages are to be made generally available throughout the arena and are oriented to a new facility with more efficient concession operations.

Parking income per capita is related to the parking charge per vehicle, the average number of people per car, and the proportion of the total attendance that arrives by private auto. One way to prepare such estimates is to assume a fixed per car charge (usually \$1.00 in large city facilities), an average size party or number of people per car (about three), and an average cost of operating a parking facility (from \$0.12 to \$0.18 per car) for the schedule of events. Such per capita income figures are higher than the ones used in Exhibit V-1 which are based on actual experience at comparable parking facilities elsewhere. Because the Boston market is perhaps somewhat less dependent on the private auto than is typical of other areas, the more conservative estimates are used in the appropriate section.

A more important factor that influences parking revenue potential is the ability of the arena management to exploit the parking demand created by activities at the arenas. Both the North Station and South Station sites are expected to have adequate adjacent parking provided by others, therefore, there will be no parking revenue potential for the arena at these sites.

Other sites and design configurations assume provision of controlled

parking in the following amounts:

Remodel Boston Arena	300 cars
Build new arena on present site	450 cars
Build small arena at Kendall Square	1,000 cars

Because of these site-related strictures on the arenas' capacity to exploit parking revenue, the net effect of parking revenue on overall financial feasibility will be considered in Chapter VII dealing with site-related factors.

Attendance is the other major income variable to be considered. Average attendance relates to the type of event, the quality of the show, effectiveness of promotion, etc. Exhibit V-2 summarizes average attendance projections per event day for each of the pertinent uses. The attendance projections have been extended by the per capita arena revenue estimates (excluding parking revenue) to produce a per day arena revenue projection for each major type of activity.

Typical arena lease arrangements often provide for flat daily rentals for graduations, conventions, meetings, and the like. Daily rental charges for a small arena should range from \$400 to \$800. For these projections, a daily rate of \$500 was used for these types of events. In addition, practice hockey sessions will probably occur in a new arena, but not to the extent that they are held in the existing Boston Arena. The income from these practice meets was estimated on an annual net basis.

Based on the foregoing assumptions, the projected net arena income from rentals and concessions is presented in Exhibit V-2. Parking income is not included in these projections.

Expenses

Expenses of operating an arena can be divided into four basic classes. One of these is the expense of setting up and tearing down special facilities for a particular type of event. These costs are typically billed directly to the tenant and result in offsetting income and expense items. For these reasons, the so called "reimbursements" are generally irrelevant in terms of defining the operating surplus (deficit) of a facility of this type.

Another type of operating expense deals with the overhead of maintaining a facility regardless of the schedule of events. Such things as administrative salaries, non-reimbursed utility expenses, regular maintenance, insurance, etc. take on many of the characteristics of a fixed operating expense. The level of fixed operating expense appropriate to this analysis is presented in Exhibit V-3.

Although the overhead and administrative costs of operating an arena are relatively fixed costs, as discussed above, different scales of operation will require different overhead levels. The actual variable costs of operating an event, however, are typically borne by the tenant.

One additional type of cost is appropriate to some types of operations in which the arena management co-promotes events. The possibilities for co-promotion in a publicly operated facility are limited. It is questionable public policy for an arena operation to assume an entrepreneurial role. In addition, the nature of a public organization often makes it difficult for them to function in an entrepreneurial role. For this reason, possible co-promotion income and expenses were excluded in these projections.

Fixed operating expenses of an arena are composed of administrative and

executive salaries and expenses, building operations, utilities, etc.

Labor costs make up the most substantial element. Not included in the projections in Exhibit V-3 are labor expenses for ushers, ticket takers, event clean-up, etc., which are reimbursed by tenants. Similarly, the costs for utilities include only those costs not reimbursed by tenants. Reimbursed expenses could easily add \$20,000 to \$30,000 per year to both revenues and costs, but the net effect is that they tend to offset one another.

Net operating income is operating income less operating expenses. The figures for operating surplus are summarized in Exhibit V-4. In addition to incomes from rent and concessions are practice rentals, office rentals and scoreboard and other advertising income.

EXHIBIT V-1

PER CAPITA INCOME TO ARENA BY TYPE OF EVENT

Event	Income Source:			
	Rentals	Concessions	Parking	Total
Boxing/Wrestling	\$ 0.60	\$ 0.26	\$ 0.26	\$ 1.12
Roller Games	.50	.20	.26	.96
CCTV	.40	.33	.26	.99
Track	.50	.14	.23	.87
Professional Entertainment	.55	.10	.26	.91
Circus/Rodeo	.50	.20	.26	.96
Disney, Pageants, etc.	.46	.16	.26	.88

Source: Darley/Gobar Associates, Inc.

EXHIBIT V-2

ATTENDANCE AND REVENUE PROJECTIONS BY TYPE OF EVENT FOR A SMALL ARENA

Event	Average Attendance Per Event	Per Capita Income (Excl. Parking)	Average Income Per Event	Total Annual Income to Arena
Boxing/Wrestling	4,000	\$0.86	\$3,440	\$ 34,400
Roller Games	3,000	.70	2,100	21,000
CCTV	4,000	.73	2,920	29,200
Amateur Sports	Flat Daily Rental Plus Concessions		665	79,800
Professional Entertainment	4,500	.65	2,925	14,625
Circus, Rodeo	4,500	.70	3,150	31,500
Pageants, Rallies, Etc.	3,000	.62	1,860	9,300
Conventions	Flat Daily Rental		500	5,000
Other Events	Flat Daily Rental		500	22,500
			TOTAL	\$247,325

* Based on event schedule shown in Exhibit IV-9

Source: Darley/Gobar Associates, Inc.

EXHIBIT V-3

NON-REIMBURSED ANNUAL OPERATING EXPENSE
PROJECTIONS FOR A SMALL ARENA

Item	Amount
Administrative Salaries and Payroll Taxes	\$ 31,000
Office Salaries	8,000
Taxes and License	200
Telephone and Telegraph	2,000
Office Supplies	1,000
Legal and Audit	4,000
Dues and Subscriptions	500
Insurance	12,000
Travel and Entertainment	2,000
Building Operation Labor Costs	45,000
Utilities ¹	15,000
Materials, Supplies, and Repairs	25,000
Contingency	20,000
	<u>\$165,700²</u>

1. Excludes utilities costs reimbursed by tenant.

2. Excludes provision for continuing program of capital improvements of approximately \$30,000 per year.

Source: Darley/Gobar Associates, Inc.

EXHIBIT V-4

DEBT SERVICE CAPACITY FROM ARENA OPERATING SURPLUS

Item	Refurbish Existing Boston Arena	New Small Arena
Operating Income	\$247,325	\$247,325
Net Income from Hockey Practice	30,000	30,000
Other Net Income (Rents)	---	13,000
Total Net Income	\$277,325	\$290,325
Operating Expenses	165,700	165,700
Operating Surplus	\$111,625	\$124,625
Debt Service Capacity	\$1.9 Million	\$2.1 Million

Source: Darley/Gobar Associates, Inc.

CHAPTER VI

ARCHITECTURAL ANALYSIS

INTRODUCTION

The purpose of this chapter is to establish criteria for program, site, budget and time considerations only. No attempt has been made to develop a design solution for the various types of structures programmed or recommend a site solution for the sites considered.

The Boston Arena Authority, together with the economic consultant, have determined that there is a need to consider the following:

1. A multi-purpose arena with a seating capacity of 6,000 permanent and 2,000 temporary seats. The primary function of this structure is for secondary school and college use. (small arena)
2. A practice/competition track with seating for 1,000. The primary use is intended for secondary school participants. (practice track)
3. The renovation of the existing Boston Arena could be considered as an alternate to 1 above. (existing arena)

Four sites have been selected by the Boston Arena Authority for consideration. These are: South Station, North Station and Kendall Square and the existing Boston Arena site. At each of these sites, various alternatives are proposed.

1. Construct small arena at South Station, North Station or Kendall Square or at the site of the existing Boston Arena. It is our recommendation that the practice track be related to this facility.

2. Remodel existing Boston Arena.

NOTE: Several of these alternatives may require additional land.

However, for evaluation, we have prepared cost estimates on the assumption that additional land can be obtained.

PROGRAM ANALYSIS

The Programs of Requirements listed below are based on economic data contained in other chapters of this report, functional requirements and comparable facilities in other cities. Parking requirements are based on type of arrivals; existing spaces available; and a ratio of 3.5 persons per car for all automobile arrivals. (See Exhibit VI-1).

EXHIBIT VI-1

TYPE OF ARRIVAL TABULATION

Site	TYPE OF ARRIVAL				Recommended No. of Parking Spaces to be Provided
	Maximum Attendance Planned	Public Trans- portation	Auto- mobile	Parking Available Within One-Fourth Mile Radius	
Existing Boston Arena	7,000	2,450	4,550	1,033 ¹	300
	8,000	2,800	5,200	1,033 ¹	450
South Station	8,000	4,000	4,000	7,497 ¹ & 2	0
North Station	8,000	4,000	4,000	4,761 ¹ & 3	0
Kendall Square	8,000	2,800	5,200	500	1,000

1 Information obtained from Off-Street Parking Inventory 1968/1969 Transportation Facts
Boston Redevelopment Authority.

2 Includes 5,000 parking spaces planned for site.

3 Includes Government Center Garage, and new 1,000 car garage planned for site.

PROGRAM OF REQUIREMENTS SMALL ARENA

PROGRAMMED EVENTS

Ice Hockey
Basketball
Gymnastics
Track
Boxing and Wrestling
Public and Religious Meetings
Concerts
Entertainment Spectaculars
Public Ice and Roller Skating

SPECTATOR SUPPORT FACILITIES

Armchair seats -8,000 (includes 2,000 temporary seats)
Public toilets and concourses
Ramps, stairs and elevators
Ticket booths (4)
First Aid Room
Lost and found
Security room

CONCESSION FACILITIES

Public stand*
Vendor stations*
Commissary*

OFFICE FACILITIES

Ticket (3,500 square feet)
Management (4,000 square feet)

*Lessee provided equipment not in estimate.

PRACTICE TRACK FACILITIES

Seating for 1,000

Complete track equipment

DRESSING FACILITIES

Team -8 (capacity 20 each)

Employee-2 (capacity 10 each)

Concession -2 (capacity 30 each)

Star-6

PRESS FACILITIES

Working press -30

T.V.- 1 booth

Radio- 2 booths

Teletype room (5 stations)

Toilets

Interview room

MAINTENANCE FACILITIES

Storage

Seat

Equipment

General

Shop

Freight elevator

Sound system and equipment room

Loading dock

Mechanical, electrical, telephone and janitor's areas

EQUIPMENT

Includes signs, turnstiles, trash handling facilities, basketball floor and goals, pads, hockey dasher and nets, zamboni, benches, insulated floor, boxing ring, bell, portable stage, indoor track, dash track, pits, scoreboard, spotlights, blackout draperies, etc.

SITE FACILITIES

Landscaped entrances and pedestrian areas

Bus, taxi and automobile approaches

Staging and service areas

Automobile parking

South Station	0
---------------	---

North Station	0
---------------	---

Kendall Square	1,000
----------------	-------

Existing Boston Arena

Site	450
------	-----

EXISTING ARENA

The basic problems with the existing arena are control of spectators and participants, inadequate dressing, office and public space, and a general deterioration of the facility. The structure is sound, sight lines and seating distribution adequate and the general plan operational.

Renovation should include a general upgrading of finishes and condition of spaces, new seating, a new underfloor piping system for ice making (equipment is adequate); new dressing facilities, upgrading of press facilities, new office, concessions and toilets, new equipment purchases, and construction of a new public lobby area.

With careful thought and execution, the renovation of the existing arena structure could adequately serve the needs of the projected new small arena, with the possible exception of the permanent practice track. However, the usage could never be expanded to handle functions programmed for the large arena discussed in a companion report.

While costs of renovation are substantial, they are nevertheless lower than the construction of a new facility. The renovation of the existing arena cannot produce a facility equal to a new well-designed arena. Site and planning considerations may dictate that renovation is not advisable.

PROGRAM OF REQUIREMENTS EXISTING ARENA

PROGRAMMED EVENTS

Ice Hockey

Basketball

Gymnastics

Track

Boxing and Wrestling

Public and Religious Meetings

Concerts

Entertainment Spectaculars

Public Ice and Roller Skating

SPECTATOR SUPPORT FACILITIES

Armchair seats -6,500 to 7,000 includes temporary seats

Public toilets and concourses

Stairs and elevators

Ticket booths (6)

First Aid Room

Lost and found

Security room

CONCESSION FACILITIES

Public stands*

Vendor stations*

Commissary*

OFFICE FACILITIES

Ticket (3,000 square feet)

Management (5,000 square feet)

DRESSING FACILITIES

Team-8 (capacity 20 each)

Employee-2 (capacity 10 each)

Concession- 2 (capacity 40 each)

*Lessee provided equipment not in estimate.

PRESS FACILITIES

Working press-20

TV- 1 booth

Radio-2 booths

Teletype room (5 stations)

Toilets

Interview room

MAINTENANCE FACILITIES

Storage (15,000 square feet)

Seat

Equipment

General

Shop (2,500 square feet)

Freight elevator

Sound system and equipment room

Loading dock

Mechanical, electrical, telephone and janitor's area

EQUIPMENT

Includes signs, turnstiles, basketball floor and goals, trash handling facilities, hockey dasher and nets, benches, insulated floor, boxing ring, portable stage, indoor track, dash track, scoreboard, etc. Some reuse of existing equipment can be anticipated.

SITE ANALYSIS

The scope of this section is to conclude if the programmed facility could be built on the sites in question. In reviewing the sites selected by the Boston Arena Authority, the following criteria are examined:

1. Area and configuration
2. Subsurface conditions
3. Topography
4. Access and egress

The approximate area required for a small arena building is three acres.

On the sites which can accommodate surface parking, a figure of 110 cars per acre is used.

Subsurface soil conditions were obtained from the Journal of the Boston Society of Civil Engineers. It appears that pile or caisson foundations are required on each of the sites evaluated. A thorough sub-surface investigation should be made prior to final site selection.

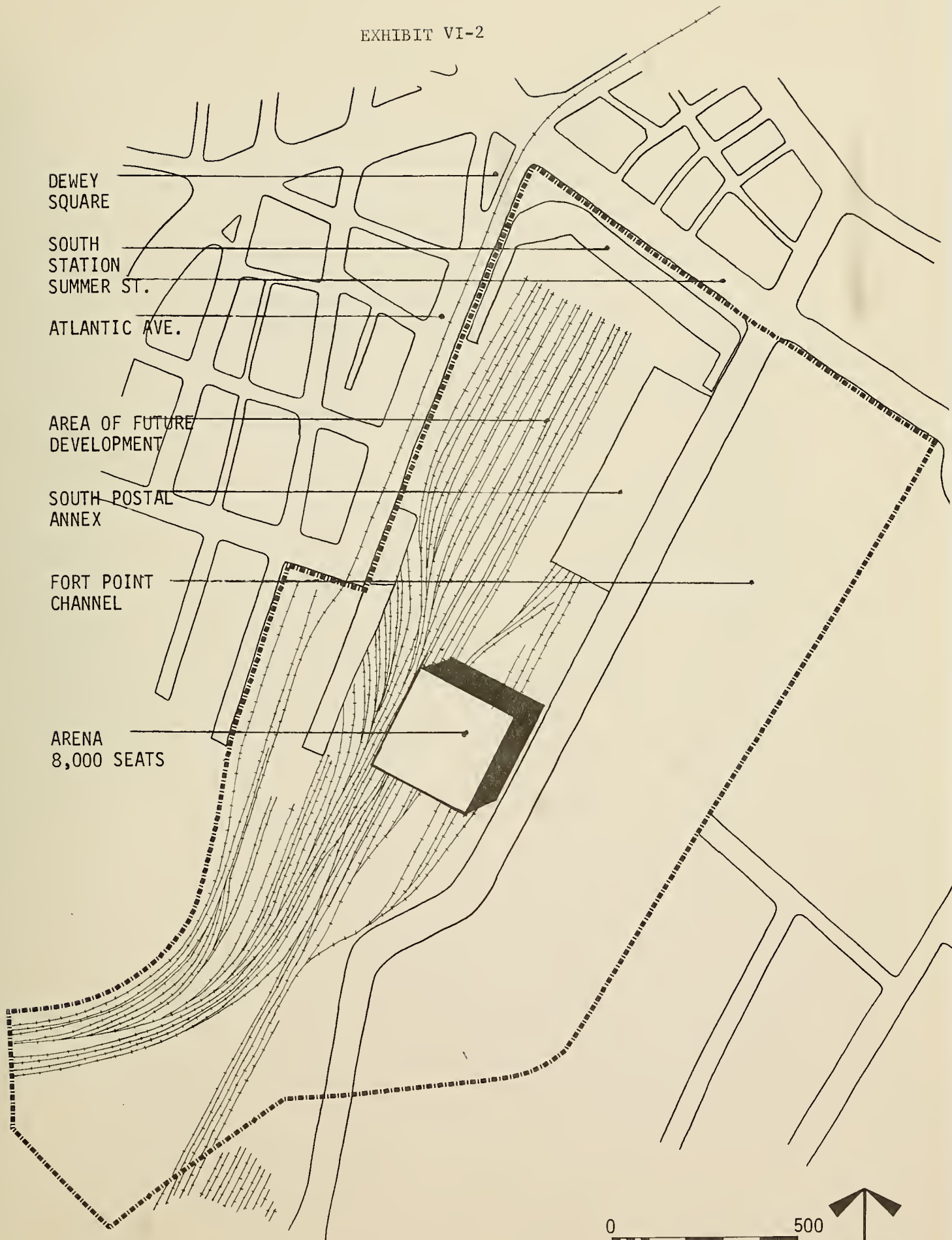
Access and egress for the sites are evaluated on existing surface streets, parking, facilities, limited access highways, street car routes, bus routes and rapid transit lines and stops in the area of the site. Consideration has been given to the number of possible transfers that potentially would have to be made by people arriving by way of the rapid transit system in determining the percentage of arrivals.

Planning implications are based on discussions with the Boston Redevelopment Authority, Metropolitan District Commission and the Cambridge Redevelopment Authority and the planned land use for each of the sites evaluated. This is an important consideration and careful study should be given to the impact created by facilities of this type upon the proposed and/or existing land use of the area.

SOUTH STATION

The area available for the arena facility is approximately 64 acres which has a configuration as indicated in Exhibit VI-2. The amount of land available is sufficient. At this site, it is envisioned that the arena floor may be raised above the existing grade to allow for continued use of the tracks as well as to allow for service considerations. This obviously increases construction costs. If the practice track is to be included in this development, it is felt that it would be advantageous to integrate it into the arena complex by raising the arena floor to allow for this facility at the lower level. The subsurface conditions consist of a layer of overburden composed of fill, silt, sand, blue clay and gravel. Though the approximate depth of hard rock capable of supporting cussions is between 100 and 120 feet, the topography of this site is basically flat which is satisfactory for this type of facility.

Access and egress for the site are adequate for automobile movement. Assuming that the proposed 5,000 parking spaces are constructed at this site as planned(see Exhibit VI-1), adequate parking facilities are available.



SOUTH STATION

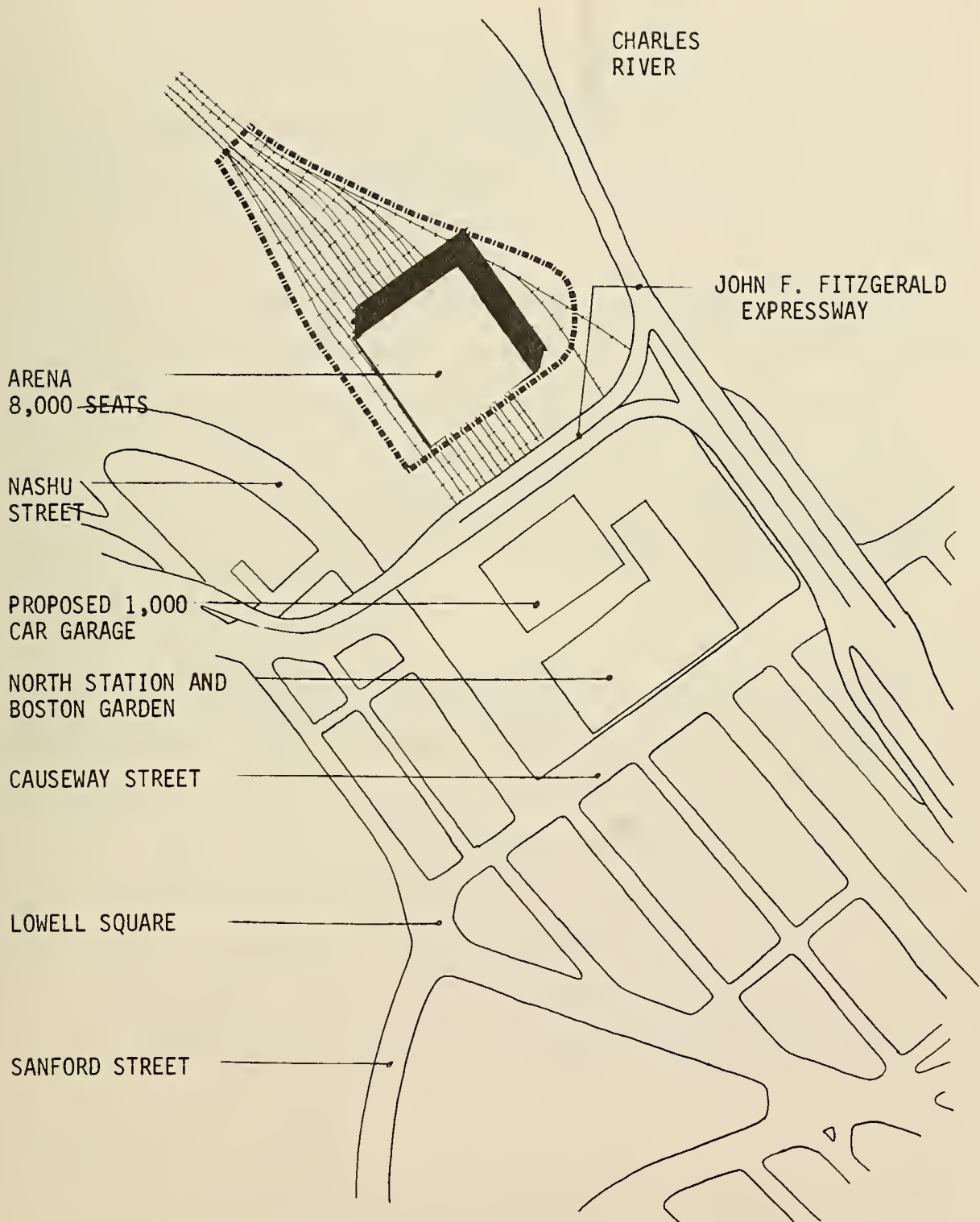
This station is served by one rapid transit line (red). Access to two other lines (orange and green) can be accomplished by one transfer. Access to the remaining line would require two transfers. It is anticipated that 50% of the people will arrive by transit. This site can also be served by a commuter boat line and New York-Boston High Speed rail system.

The development of the site as envisioned by Boston Redevelopment Authority includes a complex of parking, hotels, shops, a transportation center and office buildings. Considering the envisioned planned land use of the site, it is felt that the arena is compatible with the complex and can be incorporated into the development.

NORTH STATION

The areas available for the arena facility is approximately six (6) acres which has a configuration as indicated in Exhibit VI-3. The amount of land available is sufficient. At this site, it is envisioned that the arena floor may be raised above the existing grade to allow for continued use of the tracks as well as to allow for service considerations. This will result in higher construction costs. If the practice track is to be included in this development, it is felt that it would be advantageous to integrate it into the arena complex by raising the arena floor to allow for this facility at the lower level. The subsurface conditions consist of a layer of overburden composed of fill, silt and sand. The approximate depth of hard rock capable of supporting caissons is between 60 and 70 feet. The topography of the site is basically flat which is satisfactory for this type of facility.

Major traffic arteries in the area are sufficient to handle the number of cars anticipated but it appears that some improvements will be necessary.



NORTH STATION



If this site is selected, traffic studies should be made to determine what improvements are required.

Assuming that the proposed 1,000 parking spaces are constructed at this site as planned (see Exhibit VI-1), adequate parking facilities are available. Adequate facilities can be incorporated to handle the arrivals by taxi and bus.

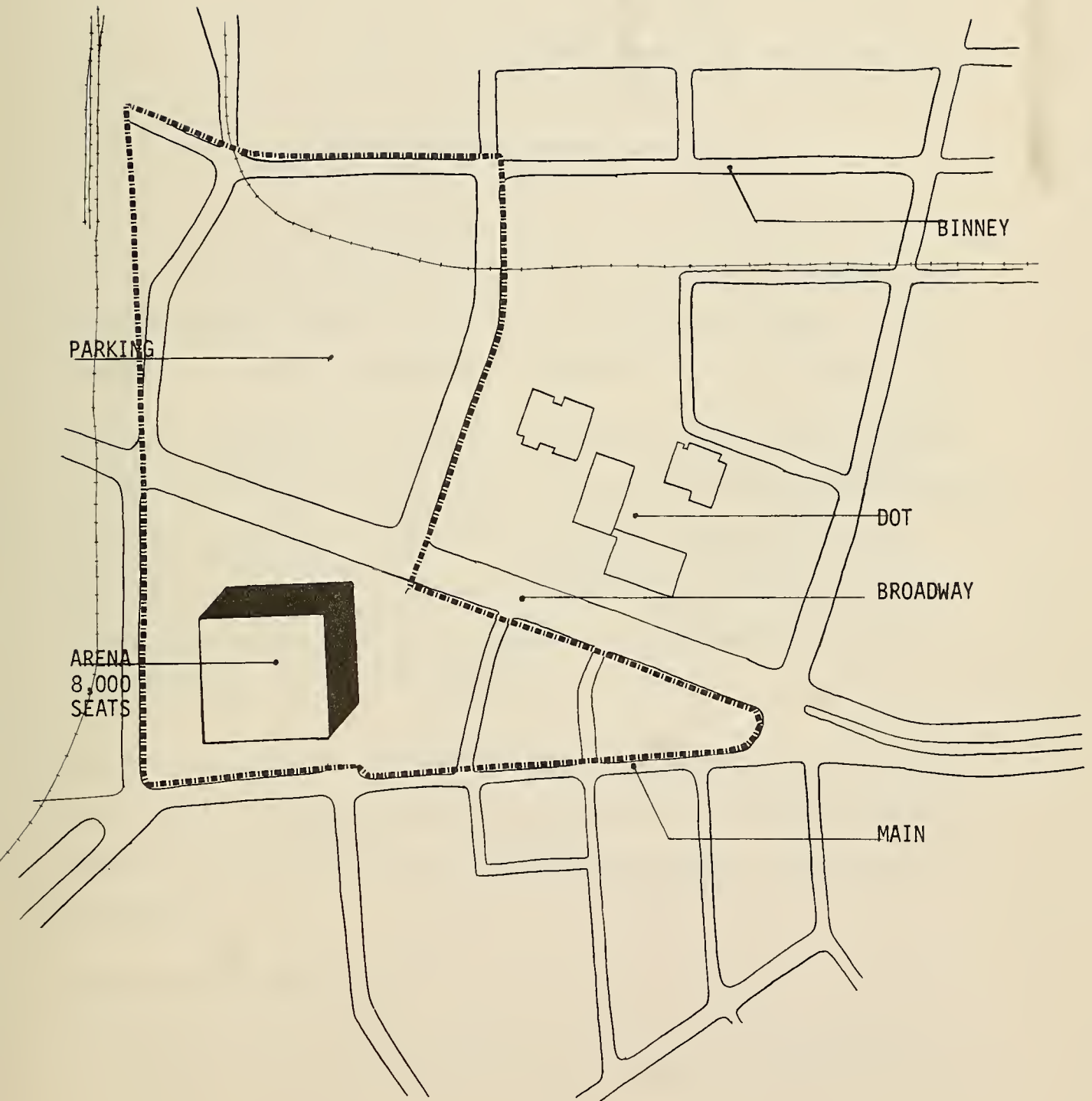
This station is served by two rapid transit lines (orange and green). It is anticipated that 50 percent of the people will arrive by transit. Access to the other two lines (blue and red) can be accomplished by one transfer. The site is served by four commuter lines serving the northern suburbs. Another possible advantage of North Station is that it has established itself as the location in the city for indoor sports with the presence of the Boston Garden.

The 1,000 car parking facility mentioned above is planned to be erected northwest of the station between the station and the elevated roadway. The Arena, as shown in Exhibit VI-3, is envisioned northwest of the elevated roadway. This situation creates a somewhat difficult and long walk for pedestrians in North Station to actually get into the structure since they must bypass the proposed new parking facility and cross under the elevated roadway before entering. To provide an adequate solution for satisfactory pedestrian circulation increases site development costs.

KENDALL SQUARE

The area available for the arena facility is approximately 24 acres which has a configuration as indicated in Exhibit VI-4. The amount of land available is sufficient. At this site, it is envisioned that the arena floor be on or below existing grade level which offers construction savings.

EXHIBIT VI-4



KENDALL SQUARE

0 500
SCALE



If the practice track is to be included in the development, it is felt that it would be advantageous to integrate it into the arena complex by raising the floor to allow for this facility at the lower level. The subsurface conditions consist of a layer of overburden composed of soft to medium blue clay with bedrock at 100 foot depth. The topography of this site is basically flat and satisfactory for this type of facility.

The only transit line serving the site is the red line. Since this site is out from the CBD of Cambridge and the transit stop is several long blocks from the proposed location, it is felt that the number of arrivals by the transit system would be approximately 35 percent of total attendance.

As noted in Exhibit VI-1, the number of parking spaces required to operate an arena at this site would create a situation that would dictate that about 14 acres of the site be absorbed for parking and building. The lack of existing surface streets to handle this capacity of cars, even at off-peak hours, suggests that if this site is selected, study should be given to a rapid busway system to serve the facility.

Land use projections by the Cambridge Redevelopment Authority envision research office and housing development in this area. An arena may not be compatible with this type of development and the impact created could be detrimental.

EXISTING BOSTON ARENA SITE

The area of this site is approximately 2 acres as indicated in Exhibits VI-5 and VI-6. This is insufficient area to permit remodeling the existing arena or constructing a small arena at this site. If the existing facility

EXHIBIT VI-5

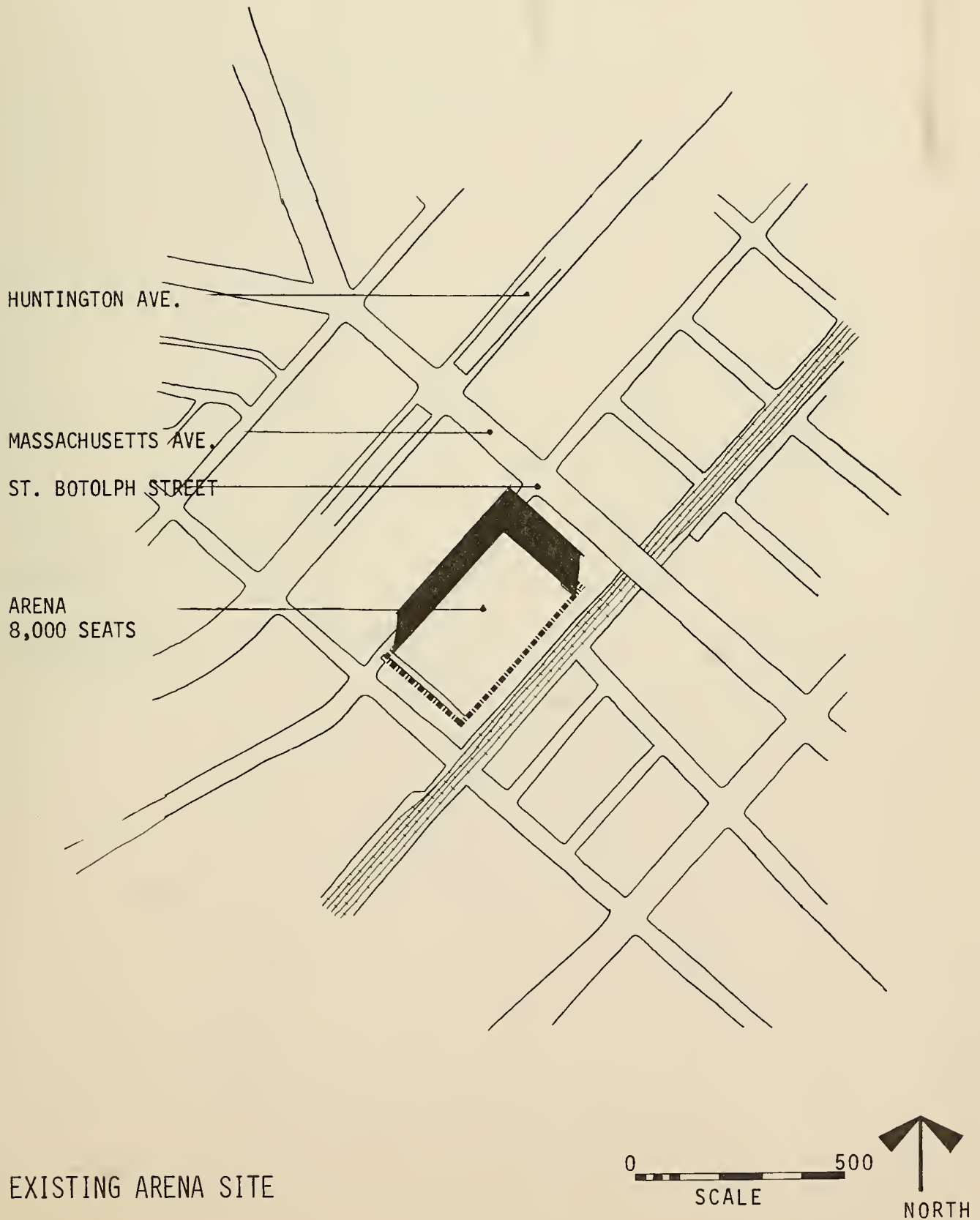
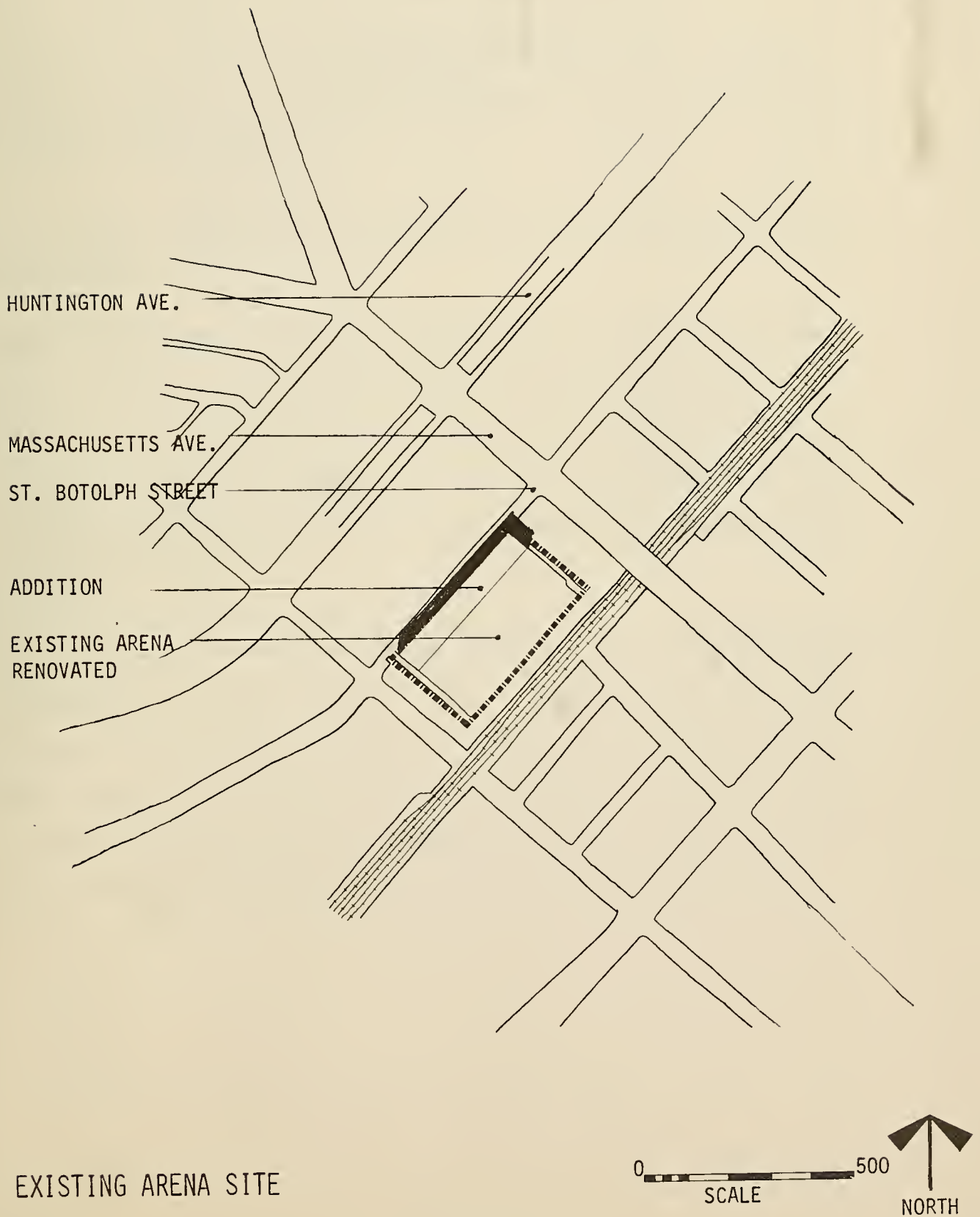


EXHIBIT VI-6



is to be remodeled, it is necessary to acquire adjoining land to provide for parking of 300 cars. If the new small arena is to be build at the site, additional space should be obtained to park 450 cars.

Information on surrounding soil conditions indicates there is a layer of overburden composed of fine silty sand and gravel with very stiff blue clay at a depth of 40 feet (+).

The topography of this site is basically flat and is satisfactory for this type facility.

Access and egress for the site by automobile can be accomplished satisfactorily. The site is served by the Symphony transit stop, a branch of the green line, and the green line of the local street car system. Access to the three remaining lines (orange, red and blue) can be accomplished by one transfer. Therefore, transit arrivals are estimated at 35 percent of total attendance.

Presently, the area of this site is not included in any redevelopment plans. The neighborhood has a bad record of crime and does not seem to be a good location for this type of facility. As indicated in the Estimate Section, remodeling the existing facility into an arena which will adequately serve schoolboy type functions appears economically attractive without consideration to the operational characteristics of the site and neighborhood.

TIME SCHEDULES

The time schedules listed below are normal or non-accelerated. By utilizing project acceleration techniques, these times could be reduced. All schedules are based on a single responsibility construction contract.

Time is computed in weeks.

Renovation of Existing Arena	Weeks Each Phase	Total Time Elapsed
Schematic Design Phase	10	10
Client's Review and Approval	1	11
Design Development Phase	12	23
Client's Review and Approval	2	25
Contract Documents Phase	40	65
Client's Review and Approval	2	67
Contract Documents Reproduced, Bound and Shipped	1	68
Bidding Phase	6	74
Bids Reviewed and Contract Awarded	1	75
Construction Phase*	60	135

*Existing facility to be closed during construction.

Small Arena (All sites)	Weeks Each Phase	Total Time Elapsed
Schematic Design Phase	6	6
Client's Review and Approval	1	7
Design Development Phase	8	15
Client's Review and Approval	1	16
Contract Documents Phase	24	40
Client's Review and Approval	2	42
Contract Documents Reproduced, Bound and Shipped	1	43
Bidding Phase	6	49
Bids Reviewed and Contract Awarded	1	50
Construction Phase	75	125

ESTIMATES

The estimates are based on the applicable Program of Requirements, a cleared site, the award of a single responsibility general contract and the December 1971 ENR (Engineering News Record) Building Cost Index for the Boston area which is 1012. Any projection for costs beyond this date should be updated to the award of the contract. Not included are allowances for any off-site construction, utility extensions or enlargement, lessee furnished equipment or land costs as applicable.

These are conservative programming estimates, based on functional requirements, building systems and site conditions. It is necessary to develop Schematic Phase Documents for a specified solution before a final project cost can be determined.

SMALL ARENA - SOUTH STATION

Arena and practice track facilities	\$ 8,800,000.00
Site development	200,000.00
Equipment	650,000.00
Total Construction Costs	\$ 9,650,000.00

Deduct for practice track facilities \$1,500,000.00

Adjusted total construction costs \$8,150,000.00

Allowances

Surveys, testing, resident

representative, repro-

duction, travel, archi-

tectural, engineering

and consultant fees, etc.

\$ 868,500.00

In-progress contingency

\$ 482,500.00

TOTAL PROJECT COSTS (excluding land)	<u>\$11,001,000.00</u>
--------------------------------------	------------------------

Deduct for practice track facilities \$1,710,000.00

Total adjusted project costs (excluding

land)

\$9,291,000.00

SMALL ARENA - NORTH STATION

Arena and practice track facilities	\$ 8,850,000.00
Site development	350,000.00
Equipment	650,000.00
Total Construction Costs	\$ 9,850,000.00

Deduct for practice track

facilities \$ 1,500,000.00

Adjusted total construction costs \$ 8,350,000.00

Allowances

Surveys, testing, resident

representative, repro-

duction, travel, archi-

tectural, engineering and

consultant fees, etc. \$ 886,500.00

In-progress contingency \$ 492,500.00

TOTAL PROJECT COSTS (excluding land) \$11,229,000.00

Deduct for practice track

facilities \$ 1,710,000.00

Total adjusted project costs (exclud-

ing land) \$ 9,519,000.00

SMALL ARENA - KENDALL SQUARE

Arena and practice track facilities	\$ 8,650,000.00
Site development (includes surface parking for 1,000 cars)	1,000,000.00
Equipment	650,000.00
Total Construction Costs	<u>\$10,300,000.00</u>
Deduct for practice track facilities	
facilities	\$1,500,000.00
Adjusted total construction costs	<u>\$8,800,000.00</u>
Allowances	
Surveys, testing, resident representative, repro- duction, travel, archi- tectural, engineering and consultant fees, etc.	\$ 927,000.00
In-progress contingency	\$ 515,000.00
TOTAL PROJECT COSTS (excluding land)	<u>\$11,742,000.00</u>
Deduct for practice track	
facilities	\$ 1,710,000.00
Total adjusted project costs (exclud- ing land)	<u>\$10,032,000.00</u>

SMALL ARENA - EXISTING BOSTON ARENA SITE

Arena and practice track facilities	\$ 8,750,000.00
Site development (includes parking structure for 450 cars)	1,292,500.00
Equipment	650,000.00
Total Construction Costs	\$10,692,500.00
Deduct for practice track facilities	\$ 1,500,000.00
Adjusted total construction costs	<u>\$ 9,192,500.00</u>
Allowances	
Surveys, testing, resident representative, repro- duction, travel, archi- tectural, engineering and consultant fees, etc.	\$ 962,300.00
In-progress contingency	\$ 534,600.00
TOTAL PROJECT COSTS (excluding land)	<u>\$12,189,400.00</u>
Deduct for practice track facilities	\$ 1,710,000.00
Total adjusted project costs (exclud- ing land)	<u>\$10,479,400.00</u>

RENOVATE EXISTING ARENA

Renovation without practice track	\$ 3,720,000.00
Site development (includes park- ing structure for 300 cars)	980,000.00
Equipment	400,000.00
Total Construction Costs	\$ 5,100,000.00
Allowances	
Surveys, testing, resident representative, repro- duction, travel, archi- tectural, engineering and consultant fees, etc.	\$ 663,000.00
In-progress contingency	\$ 357,000.00
TOTAL PROJECT COSTS (excluding land)	\$ 6,120,000.00

CHAPTER VII
SITE CONSIDERATIONS AND
INVESTMENT IMPLICATIONS

The consultants were asked to consider four sites for a new small arena and also the alternative of refurbishing the existing Boston Arena at the current site. Construction costs, excluding land costs, for each of the pertinent options, have been developed in Chapter VI.

The highest costs of constructing a new arena facility are on the present Boston Arena site and at Kendall Square. The lowest costs of construction are at the North Station and South Station sites. In all cases, the potential net cash flow from operations will be inadequate to cover the full debt service of any of the facility options and locations being considered.

Conversion of an income flow to its debt support capacity requires the consultant to make some assumption concerning the probable interest rate prevalent in the market at the time the bonds will be sold. If current municipal bond rate patterns prevail, the probable applicable interest rate on whatever municipal debt is issued to finance construction will be in a 4.5 to 5.5 percent range. The debt constant for a 5.0 percent 40 year obligation is 5.828 percent per year, i.e. a constant annual payment at that rate will cover interest and amortization on a 40 year, 5 percent bond. The actual cash flows required to service the debt could, however, be different from the level constant, even if interest rates do not change significantly. The bond indenture could call for interest only payments in the initial years. Use of serial bond issues could also alter the timing

and amount of debt service payments. Most likely, actual interest payments will be made on a quarterly basis instead of annually as is assumed by the 5.828 percent debt constant. Except for major changes in interest rates, however, most of the factors noted will have only a minor effect on the actual cash flow requirement.

The variables in the costs of providing the facility include the different costs associated with the facility options being considered and the differential costs of construction resulting from site differences. Construction costs for the nine different combinations of facility and site that are feasible are summarized in Exhibit VII-1. Four of the alternative construction cost estimates relate to the option of providing a permanent indoor track for schoolboy practice. Consideration of the cost of such a facility is related to availability of \$3.5 million to finance a track of this type. If, by including the track, the Arena Authority is able to mobilize this capital fund, the net amount of unserviced capital investment can be reduced. The net construction cost of adding a permanent schoolboy track in the small arena configuration is \$1.71 million. If providing a track would facilitate an additional input of \$3.5 million, a capital contribution of \$1.79 million would be applicable to the costs of constructing the balance of the facilities.

The sources of capital available to cover the construction costs defined in Exhibit VII-1 include net operating income capitalized at 5 percent (a 5.828 debt constant for 40 year amortization) which will support a \$1.9 million level of debt for the refurbished arena and \$2.1 million for a new arena. Another potential source of debt support is parking revenue generated from arena-controlled parking at Kendall Square or the present

Boston Arena site. This source of investment support is inapplicable at the North Station and South Station sites where parking will be controlled by others (Exhibit VII-2). The other potential source of capital contribution is the \$1.79 million differential between the construction cost of an indoor schoolboy track and the \$3.5 million allocation for providing such a facility in Boston.

The array of these variables in Exhibit VII-3 provides a simplified integration of the net effect on total unsubsidized construction costs of various combinations of facility and site.

EXHIBIT VII-1

CONSTRUCTION COST ESTIMATES FOR ALTERNATIVE LOCATIONS AND FACILITY OPTIONS

Location	Refurbish Existing Boston Arena	Small Arena (6,000 Permanent Seats)	
		With Permanent Track*	Without Permanent Track
Site #1 Present Boston Arena Site	\$ 6,120,000	\$12,189,400	\$10,479,400
Site #2 Kendall Square	---	11,742,000	10,032,000
Site #3 North Station	---	11,229,000	9,519,000
Site #4 South Station	---	11,001,000	9,291,000

* Cost of track is \$1,710,000

Note: All land costs are excluded.

Source: See Chapter VI

EXHIBIT VII-2

PARKING REVENUE AT VARIOUS SITE OPTIONS

Option	Total Available Parking Spaces	Annual Revenue	Implicit Debt Support Capacity
Small Arena at Boston Arena Site			
a) Remodel existing arena	300	\$30,868	\$0.53 mil.
b) Build new facility	450	40,122	0.69 mil.
Small Arena at Kendall Square Site	1,000	60,450	1.04 mil.

Source: Darley/Gobar Associates, Inc.

EXHIBIT VII-3

PROJECTED CAPITAL INVESTMENT SUBSIDIES REQUIRED TO REFURBISH
BOSTON ARENA OR BUILD COMPARABLE NEW ARENA

	Site #1 Present Site	Site #2 Kendall Square	Site #3 North Station	Site #4 South Station
Construction Costs:				
Refurbish existing arena	\$6.12 mil.			
Build new arena	\$10.48 mil.	10.03 mil.	9.52 mil.	9.29 mil.
Debt supported by operating profit	\$1.90	2.1	2.1	2.1
Net unsupported debt	\$4.22	8.38	7.93	7.42
Potential additional debt support capital contribution for track	N/A	1.79	1.79	1.79
Net unsupported debt	\$4.22	6.59	6.14	5.63
Potential additional debt support from parking revenues	.53	.69	1.04	N/A
Net unsupported debt	\$3.69	\$ 5.90	\$5.10	\$5.63
				\$5.40

Source: Darley/Gobar Associates, Inc.

APPENDIX A

ECONOMIC IMPACT EFFECTS OF CONVENTION ACTIVITY

Availability of a new or refurbished small arena in Boston would permit the area to accommodate additional conventions. Boston has a lower activity level of larger conventions than the area's size and location would indicate. Facility limitation is the most apparent inhibiting factor. The pro-forma event day schedule for a new small arena is a compromise between events needed to generate revenue and events oriented to public needs. That schedule projects ten days of convention activity, representing a net contribution to the Boston area's total convention schedule. Convention activity at the projected level will add to Boston's visitor population and tourist and convention expenditure potential. The Convention expenditure from such new activity is expected to amount to a little less than \$2.0 million per year. The total income effect, allowing for the economic multiplier is expected to result in a \$6.0 million per year increase in rents, profits, wages, salaries, and interest paid to Boston residents. The immediate beneficiaries of such economic impact are, however, the restaurants, hotels, taxies, etc. which support convention activity.

